

and *Musca*. I find, by calculation, that when Tempel's Comet arrives at perihelion at the end of March or early in April, it must follow this path in the heavens, being first situated at the end of January in the constellation *Camelopardus*, when, for want of conspicuous stars of reference, it might be said to be below the tail of *Ursa Minor*, afterwards moving to *Triangulum* and *Aries*.

Between 1866 and 1366 we should have fifteen periods of 33·28 years, and between 1366 and 868, also fifteen periods of 33·24 years.

Note on the First Comet of 1818 (Pons, February 23).

By Mr. Hind.

In the last number of the *Monthly Notices*, Professor Herschel, following Dr. Weiss, alludes to a possible connexion of the first Comet of 1818, at some previous time, with Biela's Comet. The hypothesis is founded upon an apparent similarity of an orbit calculated by Mr. Pogson for the Comet of 1818 to that of Biela, but it is one that will not bear examination.

The particulars of Pons' observations, or rather estimation of the positions of the Comet of 1818, will be found in *Zeitschrift für Astronomie*, vol. v. p. 148. Four places are given with two obvious errors. Correcting these, I have endeavoured to find the orbit which would best accord with the rough data, and have fixed upon the following elements:—

Perihelion Passage, 1818, February 3·218 G.M.T.

Longitude of Perihelion	76° 18'
Ascending Node	256 1
Inclination	34 11
Distance in Perihelion	0·6959

Motion direct.

These elements cannot be said to favour the supposed connexion of the Comet with that of Biela.

But the direct calculation of the orbit from such imperfect data for comparison with that of the periodical comet, is not in this case the most legitimate or satisfactory method of putting the above supposition to the test. We know pretty nearly what were the elements of Biela's Comet in 1772 when it was first observed, and we have accurate determinations of the orbit in 1806 and 1826. We can therefore ascertain whether it is possible to represent the observed position of Pons' comet at discovery by the elements of Biela's. I first adopt the elements of 1826, and find that with a true anomaly = $-37^{\circ} 55'$, the observed and computed longitudes would agree, but the difference of latitudes is no less than 26° . Again, if the orbit for 1772 is employed, the inclina-

tion in that year being nearly 4° greater than in 1826, I find with true anomaly $= -47^{\circ} 36'$, we have an agreement in longitude, while the difference of latitudes is increased to 29° .

These large differences appear conclusive against the idea of a possible connexion of the first Comet of 1818 with the Comet of Biela.

On the Rate of a Clock going in a Partial Vacuum.

By R. C. Carrington, F.R.S.

It is not easy to get a vacuum at all, I mean of the least degree, for one is soon reminded that Nature abhors a Vacuum. First, I had to abandon a mahogany case made for me by the late Mr. Frodsham as utterly useless, and to order another one made of copper, which after being tried and tried again, and repainted inside and out, at last proved tight. Then came the glasses, which necessarily enclose the front, to enable the height of the barometer within and the temperature within to be read. Suffice it to say, that I have broken eight pieces of glass, half an inch thick each, at an expense of £3 for each, and that now I have a plate with faults in it. Firstly I observed γ *Draconis* on three successive nights, the 29th, 30th, and 31st of August, 1872, and found the following errors,—

Aug. 29th	^s 3.25 fast on N. Alm.
30	4.37 „
31	6.71 „

the barometer standing at 27ⁱⁿ.50 from the 29th to the 30th, and at 26ⁱⁿ.00 from the 30th to the 31st. These give accordingly,—

gaining 1.12	and 2.34
at 27 ⁱⁿ .50	„ 26 ⁱⁿ .00

$$\text{or } \frac{1.22}{1.50} = 0.8133 \text{ for 1 inch midway between } 27.50 \text{ and } 26.00.$$

The observations were very good; in fact, could hardly be better. The telescope was not moved during the three days.

On September 16, I commenced another set at 28.00 barometer, and continued them on the 17th and 19th; then at 29.00 on the 19th, 20th, and 21st; then at 28.50 for the 21st, 22nd, and 25th; then at 28.00 for the 25th, 26th, and 28th; then at 27.50 for the 28th and 29th and October 3rd; then at 27.00 for October 3rd and 6th, when the glass broke again and stopped me. The observations were mostly those of ζ , δ , γ , α , and β *Aquilæ*, and were not so accordant as could be desired. Nevertheless, I give the following as the resulting rates per diem,—